Title
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Journal
Urology Practice, 6(2)

ISSN
2352-0779

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Publication Date
2019-03-01

DOI
10.1016/j.urpr.2018.06.001

Peer reviewed

UROLOGYPRACTICE

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Gender and Racial Disparities in Early Urology Exposures during Medical School

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Abstract

Introduction: Workforce disparities in medicine have been well documented. Early medical school exposures have been shown to highly influence career choice. We hypothesized that gender and racial disparities exist in early medical school exposures to urology.

Methods: We surveyed urology residency applicants who interviewed at our institution from 2016 to 2017. Student demographics were collected in addition to forms of urology exposures (clinical and research). Early urology exposure was defined as occurring before the 3rd year of medical school. Early exposures were compared by gender and racial/ethnic groups underrepresented in medicine.

Results: During the study period 72 interviewees were invited to participate and 71 completed the survey (response rate 98.6%). The majority of participants were male (54, 76%). Thirteen participants (18%) met the criteria for underrepresented in medicine. Fewer female applicants discovered urology (41% vs 75%, p=0.01), first shadowed a urologist (35% vs 68%, p=0.02), first operated with a urologist (29% vs 60%, p=0.03) and began research (0% vs 49%, p <0.001) before the 3rd year of medical school compared to male applicants. Fewer applicants underrepresented in medicine had shadowed a urologist before the 3rd year of medical school (31% vs 67%, p=0.02). We found no other statistical differences between those underrepresented in medicine and those not underrepresented in medicine in terms of other early urology exposures, medical school urology opportunities or personal exposures.

Conclusions: Disparities in early urology exposures, especially research exposure, exist by gender and less so among applicants underrepresented in medicine. Identifying these disparities may uncover systemic bias within career trajectories and provide targets for earlier interventions in medical school training.

Key Words: education, medical; sex; ethnic groups; urology

Abbreviations and Acronyms

UIM = underrepresented in medicine

Submitted for publication February 16, 2018.

The corresponding author certifies that, when applicable, a statement(s) has been included in the manuscript documenting institutional review board, ethics committee or ethical review board study approval; principles of Helsinki Declaration were followed in lieu of formal ethics committee approval; institutional animal care and use committee approval; all human subjects provided written informed consent with guarantees of confidentiality; IRB approved protocol number; animal approved project number.

No direct or indirect commercial, personal, academic, political, religious or ethical incentive is associated with publishing this article.

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2352-0779/19/62-129/0
UROLOGY PRACTICE
https://doi.org/10.1016/j.urpr.2018.06.001
Vol. 6, 129-134, March 2019
Published by Wolters Kluwer

The United States population has become increasingly diverse and many academic institutions have been challenged to better represent the populations in which they treat.[1] Gender and racial minority recruitment into medicine has been identified as one of the key strategies to address disparities in health and health care.[2] Workforce disparities, particularly within surgical fields, have been well documented.[3–5] Gender, race and educational debt of medical students have been associated with career choice.[6] How these social constructs influence whether medical students pursue surgical training deserves further study.

Urology has traditionally been a homogenous field. Data from the 2016 AUA (American Urological Association) census shows that 92% of practicing urologists are male and about 95% identify as white/Caucasian.[7] Although the number of women in urology is growing, disparities beyond absolute numbers, such as academic promotion, exist.[8,9] Additionally, female applicants are slightly less likely to match in urology compared to male applicants (75% vs 79% match rates).[10] Sources of these disparities in urology may develop before surgical training begins. In fact, early exposures in medical school often influence students' choice of a surgical career and impact whether they pursue academia.[11]

We hypothesized that gender and racial disparities exist in early medical school exposures to urology. To test this hypothesis we assessed early urology exposures among a diverse group of urology interviewees at our institution. The results of this study may provide distinct avenues to increase urology career access to female and UIM potential applicants.

Materials and Methods

Study Population

The study protocol was reviewed and approved by the institutional review board at the University of California, San Francisco (IRB No. 15-17700). We surveyed urology residency applicants (72) who interviewed at our institution from 2016 to 2017. All interviewees were invited to participate during the morning of the interview day. The confidentiality of students' responses was assured and no questionnaires were reviewed until the completion of the interview day. The program director and residency selection panel did not review the questionnaires at any point before or after the match list submission.

Questionnaire

The survey instrument can be seen in the supplementary Appendix (http://urologypracticejournal.com/). Medical student demographics were collected, including age, sex and race/ethnicity. Exposures to urology, including when interviewees discovered urology as a specialty, shadowing experiences, operating room experiences, research experience, and other medical school urology exposures such as clerkships and lectures were collected. The timing of exposure (ie before medical school, 1st year, 2nd year etc) was assessed. We then asked about personal urology exposures, such as whether a close friend/family member suffers from a urological condition or whether a parent is a urologist. The survey was pretested by staff members to ensure readability and face validity.

Exposures

We defined gender via self-identified responses to the questionnaire (male vs female). Respondents were considered underrepresented in medicine if they self-identified as black/African American, Hispanic/Latino or Native American. Respondents were considered represented in medicine if they self-identified as white/Caucasian or Asian/Asian American.

Outcomes

Early exposure was defined as occurring before the 3rd year of medical school (before medical school, 1st year or 2nd year). This definition was selected to focus on exposure that occurred before the clinical years, which has been shown to improve impressions of the field and increase interest.[12] For our Kaplan-Meier analysis the outcome of interest was timing of beginning urology research and timing of any clinical contact with urology (ie shadowing in clinic or operating room).

Statistical Analysis

All data analysis was performed in Stata® v.13. We used descriptive statistics to evaluate baseline characteristics of our study sample. Urology exposures were compared across sex and UIM status using Pearson's chi-squared test. Nonparametric tests were used for continuous variables given the small sample size and nonnormal distributions. We graphically displayed urology exposures (beginning urology research and any clinical contact with urology) using Kaplan-Meier curves by timing of exposure (before medical school, 1st year, 2nd year, 3rd year/time off, 4th year). We stratified our analysis by sex and UIM status. We performed log rank tests to compare the survival distributions statistically. All p values less than 0.05 were considered statistically significant and all tests were 2-sided.

Results

Demographics

During the study period 72 interviewees were invited to participate and 71 completed the survey (response rate 98.6%). Median age of the study participants was 26 years (IQR 25−28). The majority of participants were male (54, 76%). Thirteen participants (18%) met UIM criteria. Table 1 shows the demographic characteristics of the study population. The majority of interviewees came from a medical school where urology was offered as a rotation (63, 89%) and offered urology research opportunities (69, 99%). We found no differences in these opportunities between female vs male applicants (88% vs 88% reporting their school offered a urology rotation and 100% vs 98% reporting their school offered research opportunities) or UIM vs nonUIM applicants (85% vs 90% reporting their school offered a urology rotation and 100% vs 98% reporting their school offered research opportunities).

Main Outcomes

In table 2 we compared early exposures between female and male applicants and then by UIM vs nonUIM applicants. Fewer female applicants had early urology exposures in terms of when they discovered urology (41% vs 75%, p=0.01), first shadowed a urologist (35% vs 68%, p=0.02), first operated with a urologist (29% vs 60%, p=0.03) and began research (0% vs 49%, p <0.001). We found no significant differences in terms of medical school urology opportunities and personal exposures between female and male applicants. Fewer UIM applicants had shadowed a urologist before the 3rd year of medical school (31% vs 67%, p=0.02). We found no other statistical differences between UIM and nonUIM applicants in terms of other early urology exposures, medical school urology opportunities or personal exposures.

The figure shows the Kaplan-Meier analysis of timing of beginning research in urology and any clinical contact in urology. Overall 25% of male applicants had already begun urology research by the 1st year of medical school and 50% of male applicants had begun urology research by the 2nd year. No female applicants began urology research until the 3rd year or beyond (log rank p=0.0053). We found no differences in the cumulative incidence of beginning urology research between UIM and nonUIM applicants (log rank p=0.50). Twenty-five percent of male applicants had at least 1 urology clinical exposure before medical school compared to the 25% of female applicants with at least 1 urology clinical exposure by the 2nd year of medical school (log rank p=0.015). UIM applicants appear to be delayed to urology clinical exposures by about 1 year (log rank p=0.024).

Of the 22 applicants who discovered urology before medical school 11 (50%) reported that this was through a professor/mentor. The remaining individuals discovered urology through family members (8, 36%) or discovered the field themselves (3, 14%).

Table 1.
Demographics of urology applicants surveyed

Median age (IQR)	26 (25−28)	
No. female (%)	17	(24)
No. race/ethnicity (%):*		
Asian	23	(32)
Black/African American	5	(7)
Hispanic/Latino	7	(10)
White/Caucasian	41	(58)
Native American/Alaska Native	0	
Other	2	(3)
No. urology is offered as a rotation (%):		
Yes	63	(89)
No	8	(11)
No. school offers urology research opportunities (%):		
Yes	69	(99)
No	1	(1)

* Total greater than 71 as some applicants marked multiple races.

Discussion

Disparities in academic urology exist between female and male urologists and among urologists who identify within a group underrepresented in medicine in the United States. This study is the first to our knowledge to show that academic disparities exist well before residency and faculty life. In particular, female urology applicants begin urology research about 2 to 3 years later than the majority of male urology applicants. Similar trends are observed in clinical exposures. These trends cannot be explained by medical school urology opportunities or personal urology exposures. We do not observe disparate starting times for urology research between UIM and nonUIM applicants. However, UIM applicants are delayed about 1 year to clinical exposures.

The results of this study must be interpreted in context. We did not survey a random sample of urology applicants. However, as our program emphasizes research experience, we tended to interview those who envision a career in academia. We would expect these results to be similar on the national scale or perhaps even more disparate. We believe that this study should be repeated on a national scale to determine areas for intervention and to rule out the possibility of selection bias. The study is also threatened by recall bias. However, we do not anticipate the recall bias to be differential with respect to our exposures. Additionally, during the interview cycle urology applicants are aware of their personal

Table 2.
Early urology exposures during medical school stratified by gender and UIM status

	No. Women (%)	No. Men (%)	p Value	No. UIM (%)	No. NonUIM (%)	p Value
No. students	17	54		13	58	
Discover urology before 3rd year	7 (41)	40 (75)	0.01	6 (46)	42 (72)	0.07
Shadow a urologist before 3rd year	6 (35)	36 (68)	0.02	4 (31)	39 (67)	0.02
Operate with a urologist before 3rd year	5 (29)	32 (60)	0.03	4 (31)	34 (59)	0.07
Begin research before 3rd year	0	26 (49)	<0.001	4 (31)	22 (38)	0.63
Urologist lecture in medical school	3 (18)	8 (15)	0.80	3 (23)	8 (14)	0.40
Urology rotation offered	15 (88)	46 (88)	0.98	10 (83)	52 (90)	0.53
Personal exposures:						
Family/friend has urological condition	4 (24)	15 (29)	0.67	4 (31)	16 (28)	0.85
Parent is urologist	1 (6)	4 (8)	0.79	5 (9)	0	0.26
School had adequate exposures to urology*	2.71	2.38	0.35	2.85	2.42	0.28

* 5-Item Likert scale.

history with the field and, thus, this presents a unique opportunity to assess urology exposures.

Women are underrepresented in senior faculty roles in urology and are promoted at slower rates than their male colleagues.[9,13] In a survey of female academics in medicine investigators noted that several factors have led to women not advancing as quickly in academia. These factors include a lack of role models for combining career and family life responsibilities as well as difficulties in a work environment that is noncollaborative and biased in favor of men.[14] It is well documented that the gender bias begins early in life. By the age of 6 the concept of brilliance and its associated activities are already associated with the male gender.[15] This gender bias has been recognized throughout medical school as well.[16] Perceptions of surgical aptitude and family life considerations have influenced women to avoid surgical careers in medical school decisions.[17] Societal bias as well as those inherent within medicine and surgery most likely lead to these disparities in exposures to urology in early medical school life. Although all of the female urology applicants in our study eventually begin research, it is possible that many female medical students around the U.S. do not apply to

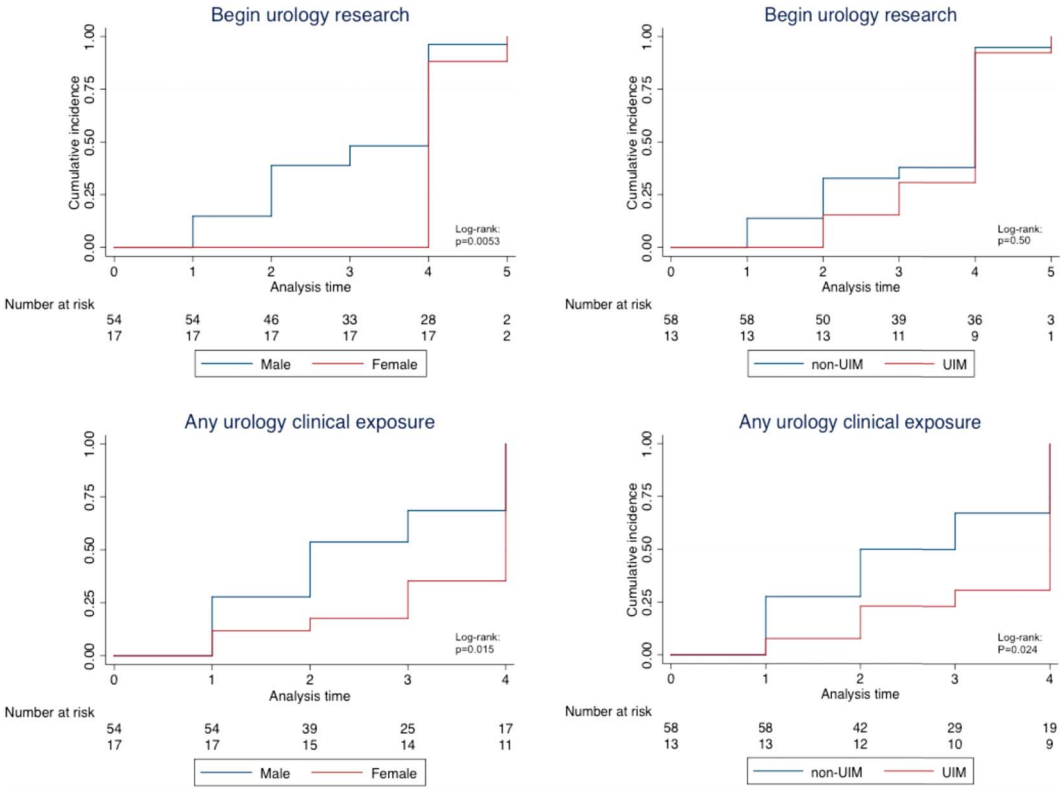

Figure. Cumulative incidence of urology exposures before/during medical school among applicants stratified by sex and UIM status. Analysis time 1—before medical school, 2—1st year of medical school, 3—2nd year of medical school, 4—3rd year of medical school/research year, 5—4th year of medical school.

urology due to lack of exposure and lack of confidence in their ability to match in a competitive specialty.

From the AUA census data in 2016, 95% of the urology workforce identifies as white/Caucasian, 2% as black/African American and about 4% as Hispanic/Latino, which does not mirror trends in the U.S. population as a whole.[7] This differential of workforce diversity is even more severe in academic urology, as 90% of all program directors identify as white or Asian, and only 5% identify as black and 2% as Hispanic/Latino.[18] Increasing provider diversity may improve patient satisfaction, break down unknown sociocultural barriers in the provider-patient relationship and expand access to care.[18–20] In the current study research exposure did not differ among UIM and nonUIM applicants. However, clinical exposures in these groups differed by about 1 year.

Specialty choices are made early on in medical school.[21] For example, 45% of medical students predicted their specialty of choice by orientation day and 69% predicted their specialty of choice by the end of the 2nd year. Thus, many decisions are made before the clinical years. Compton et al looked at the durability of specialty choice in medical school and found that those not interested in primary care were more likely to remain interested in specialty fields from the early years of medical school.[22] Mentorship during the first 2 years of medical school has been associated with specialty choice and even preclinical exposure and summer experiences have been linked to specialty choice.[23] In the current study 25% of men had been exposed to clinical urology before medical school and 10% had already started urology research at this time (see figure). Of those with urology exposures before medical school, the majority was influenced by professors or mentors, followed by family members. Thus, targeted strategies may be beneficial in the undergraduate years.

The results of this study may not apply to other surgical or medical specialties. The generalizability of this study is strengthened by the assumption that our institution interviews applicants with an interest in academia demonstrated by research publication and productivity. The extent and meaningfulness of clinical and research exposure were not measured. Due to the small sample size the independent effects of gender and UIM status were not assessed. Despite these limitations we provide evidence of a disparity in early urology exposures by gender and race/ethnicity.

Conclusions

Disparities in early urology exposures, especially research exposure, exist by gender and less so among racially underrepresented minority groups. Further research is necessary to confirm these findings on the national level. How these disparities affect match rates or academic tracks is unknown. Identifying these disparities may uncover systemic bias within medical career trajectories and provide targets for earlier interventions in medical school training.

References

1. Groman R and Ginsburg J: Racial and ethnic disparities in health care: a position paper of the American College of Physicians. Ann Intern Med 2004; **141:** 226.
2. Joseph RB, Alexander RG, Carrillo JE et al: Defining cultural competence: a practical framework for addressing racial/ethnic disparities in health and health care. Public Health Rep 2003; **118:** 293.
3. Xierali IM, Nivet MA and Wilson MR: Current and future status of diversity in ophthalmologist workforce. JAMA Ophthalmol 2016; **134:** 1016.
4. Andriole DA, Jeffe DB and Schechtman KB: Is surgical workforce diversity increasing? J Am Coll Surg 2007; **204:** 469.
5. Butler PD, Longaker MT and Britt LD: Major deficit in the number of underrepresented minority academic surgeons persists. Ann Surg 2008; **248:** 704.
6. Rosenblatt RA and Andrilla CH: The impact of U.S. medical students' debt on their choice of primary care careers: an analysis of data from the 2002 medical school graduation questionnaire. Acad Med 2005; **80:** 815.
7. American Urological Association: The State of the Urology Workforce and Practice in the United States 2016. Available at http://www.auanet.org/research/data-services/aua-census/census-results. Accessed January 14, 2018.
8. Pruthi RS, Neuwahl S, Nielsen ME et al: Recent trends in the urology workforce in the United States. Urology 2013; **82:** 987.
9. Yang G, Villalta JD, Weiss DA et al: Gender differences in academic productivity and academic career choice among urology residents. J Urol 2012; **188:** 1286.
10. American Urological Association: 2018 Urology Residency Match - Statistics 2018. Available at http://www.auanet.org/education/auauniversity/residents/residency/urology-and-specialty-matches. Accessed March 23, 2018.
11. O'Herrin JK, Lewis BJ, Rikkers LF et al: Why do students choose careers in surgery? J Surg Res 2004; **119:** 124.
12. Branstetter BF 4th, Faix LE, Humphrey AL et al: Preclinical medical student training in radiology: the effect of early exposure. AJR Am J Roentgenol 2007; **188:** W9.
13. Awad MA, Gaither TW, Osterberg EC et al: Gender differences in promotions and scholarly productivity in academic urology. Can J Urol 2017; **24:** 9011.
14. Levine RB, Lin F, Kern DE et al: Stories from early-career women physicians who have left academic medicine: a qualitative study at a single institution. Acad Med 2011; **86:** 752.
15. Bian L, Leslie SJ and Cimpian A: Gender stereotypes about intellectual ability emerge early and influence children's interests. Science 2017; **355:** 389.

16. Bleakley A: Gender matters in medical education. Med Educ 2013; **47:** 59.

17. Sanfey HA, Saalwachter-Schulman AR, Nyhof-Young JM et al: Influences on medical student career choice: gender or generation? Arch Surg 2006; **141:** 1086.

18. Vemulakonda VM, Sorensen MD and Joyner BD: The current state of diversity and multicultural training in urology residency programs. J Urol 2008; **180:** 668.

19. Saha S, Arbelaez JJ and Cooper LA: Patient−physician relationships and racial disparities in the quality of health care. Am J Public Health 2003; **93:** 1713.

20. Johnson RL, Saha S, Arbelaez JJ et al: Racial and ethnic differences in patient perceptions of bias and cultural competence in health care. J Gen Intern Med 2004; **19:** 101.

21. Zeldow PB, Preston RC and Daugherty SR: The decision to enter a medical specialty: timing and stability. Med Educ 1992; **26:** 327.

22. Compton MT, Frank E, Elon L et al: Changes in U.S. medical students' specialty interests over the course of medical school. J Gen Intern Med 2008; **23:** 1095.

23. Barshes NR, Vavra AK, Miller A et al: General surgery as a career: a contemporary review of factors central to medical student specialty choice. J Am Coll Surg 2004; **199:** 792.